IN THE DRAWINGS

With regard to the Examiner's objection to the drawings, enclosed herewith are Replacement Sheets for drawing Sheet 1 and drawing Sheet 3. Both Sheets 1 and 3 are indicated as Replacement Sheets.

REMARKS

The Applicants are filing this Amendment and Response in response to an Official Action dated October 10, 2006. At the time of the Official Action, claims 1-22 were pending. In this Response and Amendment, no claims are canceled or added. Accordingly, claims 1-22 remain currently pending. Minor amendments have been made to claims 4 and 19. The Applicants respectfully assert that those amendments do not add any new matter.

Summary of the Objections and Rejections

In the Office Action, the Examiner objected to the drawings as containing reference characters not mentioned in the specification. Claim 4 was objected to because of the use of the acronym "DCM." Claim 19 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Further, claims 1-22 were rejected under 35 U.S.C. § 103 as being obvious over U.S. Patent No. 5,963,959 to Sun et al. ("the Sun reference") in view of U.S. Patent No. 7,111,020 to Gupta ("the Gupta reference"). Each of these objections and rejections is addressed in detail below.

Objection to the Drawings

In the Office Action, the Examiner objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they include reference character(s) not mentioned in the description. The Applicants have amended the specification and the drawings as set forth above and provided on the attached Replacement Sheet(s). Moreover, the amendments to the specification and drawings obviate the objection by conforming the reference numbers used in the specification to the reference numbers used in the drawings. In view of these

amendments, the Applicants respectfully request the Examiner to withdraw the objection to the drawings.

Objection to Claim 4

In the Office Action, the Examiner objected to claim 4 based on the use of the acronym "DCM." Although Applicants do not concede the correctness of the objection, as the above term is spelled in a previous claim, Applicants have nonetheless amended claim 4 to specifically set forth the meaning of the acronym "DCM." In view of this amendment, the Applicants respectfully request the Examiner to withdraw the objection to claim 4.

Claim Rejections under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claim 19 under U.S.C. § 112, Second Paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. While not conceding the correctness of the rejection, Applicants' have nonetheless amended claim 19 to specifically recite that the "steps of the method are performed in the order in which they are recited...." Therefore, Applicants respectfully request the Examiner to withdraw the rejection of claim 19 under Section 112.

The Rejection Under 35 U.S.C. § 103

As set forth above, claims 1-22 were rejected under Section 103 based on Sun in view of Gupta. The rejection of independent claim 1 is exemplary of the rejection of the remaining claims:

> Claim 1:
> Regarding Claim 1, Sun teaches a system for performing refresh operations, the system comprising:
> a base table having a first plurality of data entries (Figures 2A,B, C, diagram 200, Sun);

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a first materialized view that comprises a second plurality of data entries, the second plurality of data entries being associated with the first plurality of data entries in the base table (Figures 2A,B, all features, wherein defined in column 4, lines 29-41, wherein a series of modifications a user might make to a master table and the corresponding entries recorded in a master log and master table 200 within FIG. 2(a) is a table of customer information including a column for a primary key CID, a customer identifier, and a column ZIP for a customer's ZIP code, wherein each row represents a particular customer, who is assigned a non-null, unique identifier, CID, wherein the corresponding master log 210 is empty and wherein master table 200 of FIG. 2(b) is the result of adding a new customer with a CID of 5 and a ZIP of 22046 to master table 200 of FIG. 2(a), wherein the primary key value of the inserted row, 5, is recorded in master log 2 10, Sun);

a refresh log that contains a plurality of changes in the base table (Figure 2C, wherein column 4, lines 42-49, the result of deleting the customer identified CID of 2 from the master table, the primary key value of 2 is stored as a new entry in master log, wherein if the zip code of customer CID of 4 in master table is changed from 22090 to 20190, then the master table is the result, the primary key value 4 of the updated row is stored as a new entry in master log, Sun); and

a module adapted to perform a refresh operation on the first materialized view using the second plurality of data entries, the module configured to (Figure 3, all features, wherein column 5, lines 10-15, the operation of a fast refresh mechanism, wherein the primary key values are selected from the master log which are not found in the master view the, the result of reissuing the snapshot definition query on the master table, Sun);

access the refresh log and the first materialized view (column 6, lines 65-66, wherein master table is accessed by the primary key values recorded in the master log, Sun);

calculate a plurality of delta values from the plurality of changes in the refresh log and the second plurality of data entries in the first materialized view (column 6, lines 43-45, wherein two new rows with column primary key, i.e. CID, of 5 and 6 are added, resulting in snapshot, diagram 400 within Figure 4e, Sun);

apply the plurality of delta values to the second plurality of data entries in the first materialized view (Figures 7A and B, all features, wherein defined in column 8, lines 52-67, Sun); and

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provide the plurality of delta values to a delta adaptation
module for updating a second materialized view (column 9,
lines 27-49, Sun).

Office Action, pp. 4-5.

Legal Precedent

The Applicants respectfully traverse the rejection. The burden of establishing a *prima*

facie case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q.

735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of

the prior art to produce the claimed invention absent some teaching or suggestion supporting

the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577,

221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the

Examiner must not only show that the combination includes *all* of the claimed elements, but

also a convincing line of reason as to why one of ordinary skill in the art would have found

the claimed invention to have been obvious in light of the teachings of the references. *Ex*

parte Clapp, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected

combination to render obvious a subsequent invention, there must be some reason for the

combination other than the hindsight gained from the invention itself, i.e., something in the

prior art as a whole must suggest the desirability, and thus the obviousness, of making the

combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed.

Cir. 1988).

Obviousness cannot be established by combining the teachings of the prior art to

produce the claimed invention absent some teaching or suggestion supporting the

combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221

U.S.P.Q. 929, 933 (Fed. Cir. 1984). One cannot use hindsight reconstruction to pick and

choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

The Rejection of Independent Claims 1, 11 and 12 Under Section 103

The rejection of independent claims 1, 11, 12 under Section 103 is improper because the Sun reference and the Gupta reference, either alone or in combination, do not teach, suggest or illustrate each and every element recited by the Applicants' claims. For example, independent claim 1 recites a system for performing refresh operations comprising a module configured to " *access* the refresh log and the first materialized view; *calculate* a plurality of delta values from the plurality of changes in the refresh log and the second plurality of data entries in the first materialized view; *apply* the plurality of delta values to the second plurality of data entries in the first materialized view; and *provide* the plurality of delta values to a delta adaptation module for updating a second materialized view." (Emphasis added). Independent claim 11 recites a system for performing a refresh operation comprising " *means for accessing* a refresh log and the first materialized view to perform the refresh operation on the first materialized view; *means for calculating* a plurality of delta values by combining a plurality of changes in the refresh log and a plurality of entries in the first materialized view; means for applying the plurality of delta values to the first materialized view; and means for providing the plurality of delta values to a delta adaptation module for refreshing a second materialized view." (Emphasis added). Further, independent claim 12 recites a method of performing a refresh operation comprising "*calculating* a plurality of delta values by combining a plurality of changes in the refresh log and a plurality of entries in the first materialized view; *applying* the plurality of *delta values* to the first materialized view; and *providing* the plurality of delta values to a *delta adaptation module* for refreshing a second materialized view derived from the first materialized view." (Emphasis added).

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In contrast, the Applicants contend that the passages of the Sun reference referred to by the Examiner do not disclose the above claim limitations. For example, the Sun reference states that "[t]he master table itself is accessed by the primary key values recorded in the master log." Sun, col. 6, lines 65-66. This disclosure has been interpreted by the Examiner to correspond to the claimed module configured to access the refresh log and the first materialized view, as recited by independent claims 1, 11 and 12. This analysis incorrectly equates Sun's master table for Applicants' claimed *refresh log*. However, as appreciated by those skilled in the art, a master table is clearly not a refresh log. Therefore, the aforementioned claim limitation is not disclosed by the Sun reference.

Further, as set forth by the Examiner, the Sun reference discloses that:

> In the example, two new rows with CIDs of 5 and 6 are added, resulting in snapshot 400 of FIG. 4(e). The result of all these operations in the fast refresh is that snapshot 400 of FIG. 4(e) is consistent with master view 404.

Sun, col. 6, lines 43-45.

This disclosure describes two new rows added to a snapshot (materialized view) which the Examiner interpreted to read the claimed module configured to calculate a plurality of delta values from the plurality of changes in the refresh log and the second plurality of data entries in the first materialized view. Applicants note that the above-cited disclosure of the Sun reference clearly does not teach a plurality of delta values, let alone calculating such delta values from a plurality of changes in a refresh log and a second plurality of data values in a first materialized view. Applicants request the Examiner to specifically point out where in the Sun reference such a recitation is taught in its entirety. Absent any such disclosure, the

Applicants respectfully assert that the rejection of all claims based on Sun in view of Gupta is

defective and should be withdrawn.

Further, the Sun reference states that:

> FIGS. 7(a)-7(e) illustrate a series of modifications made to a master table and the corresponding entries recorded in a master log. Updateable snapshot 700 of FIG. 7(a) is a snapshot of customer information including a column for a primary key CID, a customer identifier, and a column ZIP for a customer's ZIP code. Each row represents a particular customer, who is assigned a non-null, unique identifier, CID. At this point, the corresponding updateable snapshot log 710 is empty.
>
> Updateable snapshot log 710 comprises at least four columns. Updateable snapshot log 710, like master log 210, has one or more columns for the primary key, in this example, a CID column and a column for a refresh timestamp, TIME$$ as described above. In addition, updateable snapshot log 710 has a column MOD$$ which indicates the kind of modification performed. In one embodiment, MOD$$ has three values: `I` for insert, `D` for delete, and `U` for update. Furthermore, updateable snapshot log 710 has an old/new column, OLD$$, which indicates whether a primary key value for the row is old (`O`), new (`N`), or unchanged (`U`). In one embodiment, the MOD$$ and OLD$$ columns are also present in the master logs.
>
> Updateable snapshot 700 of FIG. 7(b) is the result of adding a new customer with a CID of 5 and a ZIP of 22046 to updateable snapshot 700 of FIG. 7(a).

Sun, col. 8, lines 52-67.

The above disclosure merely describes column entries of snapshot tables 700 and 710, but

clearly does not teach a module configured to apply the plurality of delta values to the second

plurality of data entries in the first materialized view, as recited by independent claims 1, 11

and 12. Absent such a teaching, suggestion or illustration, the rejection of Applicants' claims

based on Sun in view of Gupta is defective and should be withdrawn.

Moreover, the Gupta reference does not cure the deficiencies of the Sun reference because it, too, lacks disclosures teaching the above claim limitations. Moreover, the recited claim limitations are not even alleged by the Examiner to be disclosed by Gupta. For at least these reasons, the Applicants respectfully assert that the rejection of claims 1-22 under Section 103 based on Sun in view of Gupta is erroneous and should be withdrawn.

The Rejection of Independent Claims 6 and 20 under Section 103.

The rejection of independent claims 6 and 20 under Section 103 is improper because neither the Gupta nor the Sun reference, nor their hypothetical combination discloses each and every element recited by the claims. For example, independent claim 6 recites a system for performing a pipelined refresh comprising a refresh module that comprises "a first delta calculation module that calculates a plurality of delta values that represents the changes to the first materialized view; a first delta processing module that applies the plurality of delta values to the first materialized view; a delta adaptation module that receives the plurality of delta values from the first delta calculation module and calculates a plurality of changes to the second materialized view; a second delta calculation module that obtains the plurality of changes to the second materialized view from the delta adaptation module; and a second delta processing module that applies the plurality of changes to the second materialized view from the second delta calculation module to the second materialized view." Independent claim 20 recites a computer program comprising a machine readable medium comprising "a refresh manager stored on the machine readable medium, the refresh manager being adapted to refresh a first materialized view derived at least in part from a base table by computing a plurality of delta values in a delta calculation module based on the refresh log and the first materialized view, applying the plurality of delta values in a delta processing module to the

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first materialized view, and providing the plurality of delta values to a delta adaptation

module derived from the first materialized view."

In rejecting independent claims 6 and 20 the Examiner primarily cited the Gupta

reference as disclosing the above claim elements, however, in contrast to the Examiner's

assertions, Applicants contend that the Gupta reference does not disclose or suggest such

elements. For example, as set forth in the rejection, the Examiner cited the following passage

of the Gupta reference:

> Materialized views eliminate the overhead associated
> with gathering and deriving the data every time a query is
> executed. Computer database systems that are used for data
> warehousing frequently maintain materialized views that
> contain pre-computed summary information in order to speed
> up query processing. Such summary information is created by
> applying an aggregate function, such as SUM, COUNT, or
> AVERAGE, to values contained in the base tables.
> Materialized views that contain pre-computed summary
> information are referred to herein as "summary tables" or more
> simply, "summaries".
>
> Summary tables typically store aggregated information,
> such as "sum of PRODUCT_sales, by region, by month."
> Other examples of aggregated information include counts of
> tally totals, minimum values, maximum values, and average
> calculations.
>
> Gupta, col. 2, lines 30-36.

According to this passage, Gupta teaches aggregate functions that are not used to

obtain delta values, such as those derived from obtaining a *difference* or changes between at

least two values. The functions recited by the Gupta reference, such as SUM, COUNT and

AVERAGE, are clearly not adapted to do so. Thus, Gupta does not disclose the claimed first

delta calculation module that calculates a plurality of delta values that represents the changes

to the first materialized view. Based on the above analysis, it is apparent that Gupta does not

teach, suggest or illustrate a first delta processing module that applies the plurality of delta values to the first materialized view, as recited by independent claims 6 and 20. Because the Gupta reference does not disclose a first delta calculation module or a first delta processing module, it would be illogical for Gupta to disclose a second delta calculation module or a second processing delta module as recited by independent claim 6.

As previously argued, the Sun reference clearly does not disclose the above claim limitations and, therefore, does not cure the deficiencies of the Gupta reference. Accordingly, neither Gupta nor Sun (nor a hypothetical combination thereof, even if proper) can render independent claims 6 and 20 obvious.

For at least these reasons, the Examiner has failed to show a *prima facie* case of obviousness with regard to independent claims 6 and 20, as well as those claims depending therefrom. Accordingly, Applicants request the Examiner to withdraw and allow independent claims 6 and 20 and those claims depending therefrom.
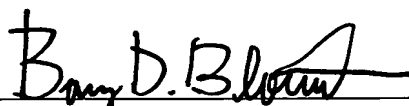
Conclusion

In view of the remarks set forth above, the Applicants respectfully request reconsideration of the Examiner's rejections and allowance of claims 1-22. Moreover, the Applicants respectfully assert that all objections and rejections have been overcome. Applicants accordingly solicit an acknowledgment of the allowability of all claims. If the

Examiner believes that a telephonic interview will help speed this application toward

issuance, the Examiner is invited to contact the undersigned at the telephone number listed

below.

Respectfully submitted,

Date: January 8, 2007

Barry D. Blount
Reg. No. 35,069
(281) 970-4545

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400